

WHAT IS CLAIMED IS:

1. A method of forming a fitting assembly in a filament-reinforced pressure vessel, the method comprising:

bonding a first fitting portion to an inner surface of a thermoplastic liner so as to form a fluid-tight seal between said first fitting portion and said thermoplastic liner;

applying a reinforcing layer to an outer surfaced of said thermoplastic liner to form a vessel wall, said reinforcing layer including reinforcing filaments commingled with a plastic material;

removing a portion of the vessel wall aligned with said first fitting portion so as to define an opening through said vessel wall;

inserting a second fitting portion through said opening and into said first fitting portion; and,

bonding said second fitting portion to said first fitting portion so as to seal said first and second fitting portions to one another in a fluid tight manner.
2. The method according to claim 1, wherein said plastic material is a thermoplastic material, and wherein, during said bonding step, said second fitting portion is also bonded to said reinforcing layer.
3. The method according to claim 2, wherein the first fitting portion and the second fitting portion are formed from a fiber-reinforced thermoplastic material.

4. The method according to claim 2, wherein the first fitting portion further comprises a peripheral seat section adjacent to the opening, and the second fitting portion engages and is bonded to the seat section.

5. The method according to claim 2, wherein the first fitting portion is bonded to the inner surface of the thermoplastic liner and the second fitting portion is bonded to the first fitting portion and to the vessel wall using heat.

6. The method according to claim 2, wherein the passageway through the first fitting portion comprises a tapered section and the second fitting portion is configured to frictionally engage the tapered section prior to being bonded to the first fitting portion.

7. The method according to claim 6, wherein the tapered section of the passageway through the first fitting portion further comprises an alignment slot and the second fitting portion is configured with a rib that slides into the alignment slot to ensure that the second fitting portion is properly aligned relative to the first fitting portion prior to being bonded to the first fitting portion.

8. The method according to claim 1, wherein said plastic material is a thermoset plastic material, and comprising the further step If, prior to applying the reinforcing layer, applying a reinforcing mat to the outer surface of the liner at a location overlying the first fitting portion.

9. The method according to claim 8, wherein the first fitting portion and the second fitting portion are formed from a fiber-reinforced thermoplastic material.

10. The method according to claim 8, wherein the first fitting portion further comprises a peripheral seat section adjacent to the opening, and the second fitting portion engages and is bonded to the seat section.

11. The method according to claim 8, wherein the first fitting portion is bonded to the inner surface of the thermoplastic liner and the second fitting portion is bonded to the first fitting portion using heat.

12. The method according to claim 8, wherein the passageway through the first fitting portion comprises a tapered section and the second fitting portion is configured to frictionally engage the tapered section prior to being bonded to the first fitting portion.

13. The method according to claim 12, wherein the tapered section of the passageway through the first fitting portion further comprises an alignment slot and the second fitting portion is configured with a rib that slides into the alignment slot to ensure that the second fitting portion is properly aligned relative to the first fitting portion prior to being bonded to the first fitting portion.

14. A method of forming a fitting assembly in a filament-reinforced pressure vessel, the method comprising:

bonding a first fitting portion to an inner surface of a vessel wall so as to form a fluid-tight seal around an opening in the first fitting portion, the vessel wall comprising an inner layer formed of a thermoplastic liner and an outer layer formed of reinforcing filaments and plastic material bonded to the thermoplastic liner;

removing a portion of the vessel wall adjacent to the opening so as to define a passageway into an interior of said vessel, the removed portion being bounded by the fluid-tight seal between the first fitting portion and the inner surface of the thermoplastic liner; and

bonding a second fitting portion to the first fitting portion, the second fitting portion being configured to provide a port between the interior of the vessel and the exterior of the vessel.

15. The method according to claim 14, wherein the plastic material is a thermoplastic and wherein, curing bonding, said second fitting portion is bonded to said outer layer.

16. The method according to claim 14, wherein the first fitting portion and the second fitting portion are formed of fiber-reinforced thermoplastic material.

17. The method according to claim 14, wherein the first fitting portion further comprises a peripheral seat section adjacent to the opening, and the second fitting portion engages and bonds to the seat section.

18. The method according to claim 14, wherein the first fitting portion is bonded to the inner surface of the thermoplastic liner and the second fitting portion is bonded to the first fitting portion and to the vessel wall using heat.

19. The method according to claim 14, wherein the passageway through the first fitting portion comprises a tapered section and the second fitting portion is configured to frictionally engage the tapered section prior to being bonded to the first fitting portion.

20. The method according to claim 19, wherein the tapered section of the passageway through the first fitting portion further comprises an alignment slot and the second fitting portion is configured with a rib that slides into the alignment slot to ensure that the second fitting portion is properly aligned relative to the first fitting portion prior to being bonded to the first fitting portion.

21. A filament-reinforced pressure vessel comprising:

a fluid-containment cavity defined by a substantially continuous vessel wall, the vessel wall comprising:

a thermoplastic liner having an inner surface and an outer surface; and

an outer layer comprising reinforcing filaments and a plastic material, said

outer layer being bonded to the outer surface of the thermoplastic

liner; and

at least one fitting assembly formed in the vessel wall, the fitting assembly comprising:

a first fitting portion bonded to the inner surface of the thermoplastic liner so as to form a fluid-tight seal around an opening of a passageway through the first fitting portion and the inner surface of the thermoplastic liner; and

a second fitting portion extending through the outer layer and the liner and being bonded to the first fitting portion, said first and second fitting portions defining a port between the fluid-containment cavity and an exterior of the vessel.

22. The pressure vessel according to claim 21, wherein the plastic material is a thermoplastic and wherein the second fitting portion is also bonded to the outer layer.

23. The pressure vessel according to claim 22, wherein the first fitting portion and the second fitting portion are formed of fiber-reinforced thermoplastic material.

24. The pressure vessel according to claim 22, wherein the reinforcing filaments are selected from a group consisting of glass filaments, aramid filaments and carbon filaments.

25. The pressure vessel according to claim 22, wherein the first fitting portion further comprises a peripheral seat section adjacent to the opening, and the second fitting portion is configured to contact and be bonded to the seat section.

26. The pressure vessel according to claim 22, wherein the passageway through the first fitting portion comprises a tapered section and the second fitting portion is configured to frictionally engage the tapered section prior to being bonded to the first fitting portion.

27. The pressure vessel according to claim 26, wherein the tapered section of the passageway through the first fitting portion further comprises an alignment slot and the second fitting portion is configured with a rib that slides into the alignment slot to ensure that the second fitting portion is properly aligned relative to the first fitting portion prior to being bonded to the first fitting portion.

28. The pressure vessel according to claim 22, wherein said plastic material is a thermoset plastic material.